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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Horan et al.

Examiner: T. Victor OH

U.S. Serial No. 09/470,360

Group Art Unit: 1625

Filed December 22, 1999

Docket No. C-7197C2 (CEL-03-3)

For: **PROCESS IMPROVEMENT FOR
CONTINUOUS ETHYL ACETATE
PRODUCTION**

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

DECLARATION OF CARL DAVID MURPHY UNDER 37 C.F.R. § 1.132

Sir:

I, Carl David Murphy, inventor in the above-noted patent application, hereby declare:

1. That I hold a Ph.D. Degree in Chemical Engineering from Carnegie Mellon University, Pittsburgh, Pennsylvania. I have worked in connection with Celanese Ltd. (formerly Hoechst Celanese Corporation) for 34 years.
2. I am familiar with the subject matter of the above-noted patent application as well as the Office Action dated February 26, 2003. I understand that the claims have been rejected over United States Patent No. 5,231,222 to *Papa et al.* ("Papa") combined with United States Patent No. 5,248,427 to *Spiske et al.* ("Spiske").

3. With respect to the Papa patent, the reference discloses water as an azeotroping agent. In this respect, it is noted in Col 7, lines 1 to 6 of Papa that it is preferred to add some water to the distillation column to aid in forming the product ester-water azeotrope, since the amount of water normally distilled from the reactor is not generally sufficient to ensure a satisfactory azeotrope. Note also, Col. 13, Example 2 of the *Papa* patent which discloses that

Water addition was simultaneously commenced to the distillation column in sufficient quantity to form the ester/water azeotrope while maintaining reactor equilibrium throughout the process. See Col. 13, lines 38 to 42 of Papa. See also Example 5 of *Papa*.

4. On the other hand, the claimed method requires the product of the esterification reaction, specifically, ethyl acetate as an azeotroping agent, as is seen in Figure 1 and page 6, lines 24 to 26 of the above-noted patent application, as filed. Unexpectedly, addition of product ethyl acetate as an azeotroping agent provided significantly better economical production of the product because of differences between the stoichiometric and azeotropic water composition of different esters.
5. This is a surprising result which is not remotely suggested by Papa as further discussed below. As stated in the specification of the above-noted application, in the case of ethyl acetate, "there is too much water produced in the reaction to match the water-ester azeotrope...[a]djusting this water to ester ratio in the distillation is important for economical production of the ester." See page 1, lines 26 to 27 of the above application. Specifically, for ethyl acetate, the stoichiometric % of water produced is 17.0% but only 8.7% water is removed in the azeotrope. See Table A of the above application. In contrast, for butyl acetate, the product of Papa, the stoichiometric % of water produced is 13.4% but a greater amount of water, specifically 28.7% water is removed in the azeotrope. See Table A of the above application.

6. In the production of butyl acetate as disclosed by *Papa*, addition of water benefits production of product ester. In the production of claimed ethyl acetate, addition of product ester benefits production of product ester. Indeed, adding water to the distillation column, as taught by *Papa* to the claimed method would inhibit production of product, ethyl acetate. This is a surprising result which is not remotely suggested by *Papa*.
7. I, as the undersigned Declarant, declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the subject application or any patent issuing thereon.

Dated Aug 22, 2003

Carl David Murphy
Carl David Murphy

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FROM: Michael W. Ferrell

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of :
Horan et al. : Group Art Unit: 1625
U.S. Serial No. 09/470,360 : Examiner: T. Victor OH
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Commissioner for Patents
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Alexandria, Virginia 22313-1450

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TRANSMITTAL OF DECLARATION UNDER 37 C.F.R. § 1.132

Sir:

Previously, Claims 6 to 11 have been rejected over United States Patent No. 5,231,222 to *Papa et al.* ("Papa") combined with United States Patent No. 5,248,427 to *Spiske et al.* ("Spiske"). In reply to the *Final Action* mailed on February 26, 2003 ("Office Action"), Applicants filed a *Request for Continued Examination Under 37 CFR § 1.114* as well as a *Preliminary Amendment* in this case.

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As was discussed at the interview on July 15, 2003, Applicants file herewith a *Declaration of Carl D. Murphy* ("Murphy Declaration") to provide additional evidence of unexpected results from the claimed process as well as to distinguish the references of record and provide comparison thereto.

It is stated in the accompanying *Murphy Declaration* that the addition of product ethyl acetate, unexpectedly, provided significantly better economical production of the product. See paragraph 4 of the *Murphy Declaration*.

This is a surprising result which is not remotely suggested by *Papa*. See paragraph 5 of the *Murphy Declaration*.

Papa teaches addition of water to the production of product ester in order to increase production. The addition of water is, of course, the addition of a by-product upstream. On the other hand, with the present invention, desirable product *per se* is recycled upstream in order to increase production. Dr. Murphy has declared that the results of that recycling are unexpected for ethyl acetate. Indeed, addition of product to increase production of that product is counter intuitive to one of ordinary skill. *Papa*, on the other hand, simply teaches the manipulation of by-product in order to optimize its process and is accordingly believed of general interest, only. *Spiske* only teaches to recycle reactants, not products and therefore, does not add anything relevant to the *Papa* disclosure. The present invention is not remotely suggested by *Papa* alone or in combination with *Spiske*.

Applicants request reconsideration and allowance of the claims.

This paper is being filed without any extension or fees. However, if any additional extension and/or fees are deemed required, please consider this paper a *Petition* therefor and charge fees to Deposit Account No. 50-0935.

Respectfully submitted,



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September 2, 2003

CERTIFICATE OF MAILING BY FACSIMILE (37 CFR 1.8)			Docket No.
Applicant(s): <i>Horan et al.</i>			C-7197C2 (CEL-03-3)
Serial No. 09/470,360	Filing Date December 22, 1999	Examiner T. Victor OH	Group Art Unit 1625
Invention: PROCESS IMPROVEMENT FOR CONTINUOUS ETHYL ACETATE PRODUCTION			
<p>I hereby certify that this <i>Transmittal of Declaration Under 37 C.F.R. §1.132 and Declaration of Carl David Murphy Under 37 C.F.R. §1.132</i> are being facsimiled to Examiner T. Victor OH (Group 1635) at 703-308-4556 and addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450, on September 2, 2003.</p>			
<p><u>Carol R. Maddaloni</u> (Typed or Printed Name of Person Faxing Correspondence)</p>			
 (Signature of Person Faxing Correspondence)			
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